



# The Weather Company (Energy Team) And NOAA Data

Presenter: Dr. Michael Ventrice

## Beyond the Forecast: Transforming Business for a Changing World

# We Are The Weather Company



Globally, we have more than

200,000+ personal weather stations

200 million mobile app downloads

750+ TV stations globally

180 million consumers

5,000+ businesses

140 airlines served

# WSI Trader

**WSI TRADER** November 06 10:14am EST Choose Region North America Contact Us | Logout | Alerts

Home | 1-15 Day | Sub-/Seasonal | Weighted Forecasts | Analytics | Tropical | Model Data | Historical | My Solutions | Blog

The Weather Company

**Forecast Table** Latest Ob: Nov 06 2017 10:06 AM EST, Forecast Made Nov 06 2017 6:32 AM EST

Lists: [TraderList](#) [ALL CITIES](#) [MISO](#) [ERCOT](#) [SPP](#) [NEISO](#) [NYISO](#) [PJM](#) [IEO](#) [SOUTHEAST](#) [NWPP](#) [AEO](#) [CAISO](#) [SOUTHWEST](#) [CONSUM. EAST](#) [PRODUCING](#) [CONSUM. WEST](#)

Min / Max Off Peak Min / On Peak Max Average Temp HOD / CDO Gas Day POP Show Forecast Differences

Location	Y <sup>1</sup>	M <sup>2</sup>	Mo <sup>3</sup>	T <sup>4</sup>	W <sup>5</sup>	Th <sup>6</sup>	F <sup>7</sup>	S <sup>8</sup>	Sat <sup>9</sup>	Sun <sup>10</sup>	Mon <sup>11</sup>	Tue <sup>12</sup>	Wed <sup>13</sup>	Thu <sup>14</sup>	Fri <sup>15</sup>	Sat <sup>16</sup>	Sun <sup>17</sup>	Mon <sup>18</sup>	Tue <sup>19</sup>	Wed <sup>20</sup>	Thu <sup>21</sup>	Fri <sup>22</sup>	Sat <sup>23</sup>	Sun <sup>24</sup>	Mon <sup>25</sup>			
Current	64	47986	40-49	38-49	38-52	27958	2639	3047	4149	3948	42-51	43-54	41-55	38-53	38-50	40-51	39-52	40-53	41-54	40-55	41-56	40-57	41-58	40-59	41-59	40-60	41-60	
Boston, MA	>	64	47986	40-49	38-49	38-52	27958	2639	3047	4149	3948	42-51	43-54	41-55	38-53	38-50	40-51	39-52	40-53	41-54	40-55	41-56	40-57	41-58	40-59	41-59	40-60	41-60
Central Park, NY	>	64	48951	43-52	43-52	3951	2891	3041	3341	3851	42-55	45-57	40-51	41-50	41-50	41-50	41-50	41-51	41-52	41-53	41-54	41-55	41-56	41-57	41-58	41-59	41-60	41-60
JFK, NY	>	63	48687	42-53	42-53	42-55	3162	2842	3052	4054	4152	43-57	45-53	40-50	42-57	40-54	39-54	40-55	41-54	42-55	43-54	44-55	45-54	46-55	47-54	48-55	49-54	40-55
La Guardia, NY	>	64	48687	43-53	44-52	43-55	3162	2842	3052	4054	4152	43-57	45-53	40-50	42-57	40-54	39-54	40-55	41-54	42-55	43-54	44-55	45-54	46-55	47-54	48-55	49-54	40-55
Baltimore, MD	>	64	47707	41-52	41-52	41-55	3048	2546	3164	4155	3846	37-55	37-55	40-50	42-51	39-55	38-55	39-55	37-55	38-55	39-55	38-55	39-55	38-55	37-55	38-55	39-55	38-55
Washington, DC	>	64	47811	41-52	41-52	41-55	3048	2546	3164	4155	3846	37-55	37-55	40-50	42-51	39-55	38-55	39-55	37-55	38-55	39-55	38-55	39-55	38-55	37-55	38-55	39-55	38-55
Philadelphia, PA	>	64	48892	42-54	42-52	42-55	3161	2744	3445	4355	4155	41-59	44-50	40-52	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59	40-59
Pittsburgh, PA	>	61	37811	36-47	36-47	36-49	3160	2745	3242	3747	3843	3450	38-53	40-53	39-50	35-53	31-45	33-48	30-52	30-52	30-52	30-52	30-52	30-52	30-52	30-52	30-52	30-52
Richmond, VA	>	65	48774	44-55	43-50	43-55	4448	3750	2748	3247	3747	3843	3450	40-55	44-55	43-54	40-54	39-54	40-55	40-55	40-55	40-55	40-55	40-55	40-55	40-55	40-55	40-55
Washington, DC	>	65	48774	44-55	44-54	44-55	4448	3750	2748	3247	3747	3843	3450	40-55	44-55	43-54	40-54	39-54	40-55	40-55	40-55	40-55	40-55	40-55	40-55	40-55	40-55	
Raleigh-Durham, NC	>	65	63377	47-53	49-54	49-55	3668	3157	3095	4082	3859	39-53	46-53	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	48-57	
Atlanta, GA	>	71	61787	10-57	10-57	10-57	4784	4782	48-51	47-55	45-54	44-55	44-55	44-57	45-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	46-52	
Jacksonville, FL	>	70	52955	95-97	95-97	95-98	6082	6172	6173	6175	6073	5773	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	51-73	
Tampa, FL	>	77	65-98	65-98	65-98	65-98	67-93	67-93	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94	65-94		
Cleveland, OH	>	49	40-53	39-49	39-49	34-49	3141	2344	3547	3649	3553	41-53	41-53	41-53	41-53	40-53	37-53	34-53	34-53	34-53	34-53	34-53	34-53	34-53	34-53	34-53		
Detroit, MI	>	49	41-53	34-53	34-53	34-53	3448	3241	3551	3651	3551	41-53	41-53	41-53	41-53	40-53	37-53	34-53	34-53	34-53	34-53	34-53	34-53	34-53	34-53			
Cincinnati, OH	>	49	41-53	35-51	35-51	35-51	3501	2744	3549	3651	3551	35-53	38-55	41-53	41-53	38-54	32-54	37-54	32-54	31-48	31-48	31-48	31-48	31-48	31-48			
Covington, KY	>	55	45-55	42-50	42-50	3383	2844	3548	3653	3553	35-54	38-55	40-55	40-55	34-54	32-54	32-54	32-54	32-54	32-54	32-54	32-54	32-54	32-54	32-54			
Chicago, IL	>	55	41483	41483	41483	41483	3041	2747	3851	3750	3752	42-54	42-54	42-54	42-54	42-54	39-54	34-54	34-54	34-54	34-54	34-54	34-54	34-54	34-54			
Minneapolis, MN	>	55	41-54	36-49	36-49	36-49	2859	2859	3549	3648	3552	42-54	42-54	42-54	42-54	39-53	37-53	32-53	32-53	33-53	33-53	33-53	33-53	33-53				
Dates Moines, IA	>	51	26144	26144	26144	26144	2341	2036	3342	3342	3342	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45	30-45				
Portland, OR	>	55	20-255	24-255	24-255	16-251	16-251	2744	2744	2744	28-35	28-35	28-35	28-35	20-43	3548	34-54	22-44	30-43	24-53	23-53	24-53	24-53	24-53				
Seattle, WA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255					
San Francisco, CA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255						
Los Angeles, CA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255							
Honolulu, HI	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255							
Albuquerque, NM	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255							
Phoenix, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255								
Tucson, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255								
Las Vegas, NV	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255								
San Jose, CA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255								
San Francisco, CA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255									
Seattle, WA	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255									
Portland, OR	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Albuquerque, NM	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Honolulu, HI	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Phoenix, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Tucson, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Las Vegas, NV	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255										
Albuquerque, NM	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Honolulu, HI	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Phoenix, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Tucson, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Las Vegas, NV	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Albuquerque, NM	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Honolulu, HI	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Phoenix, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Tucson, AZ	>	55	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255	16-255											
Las Vegas, NV	>																											

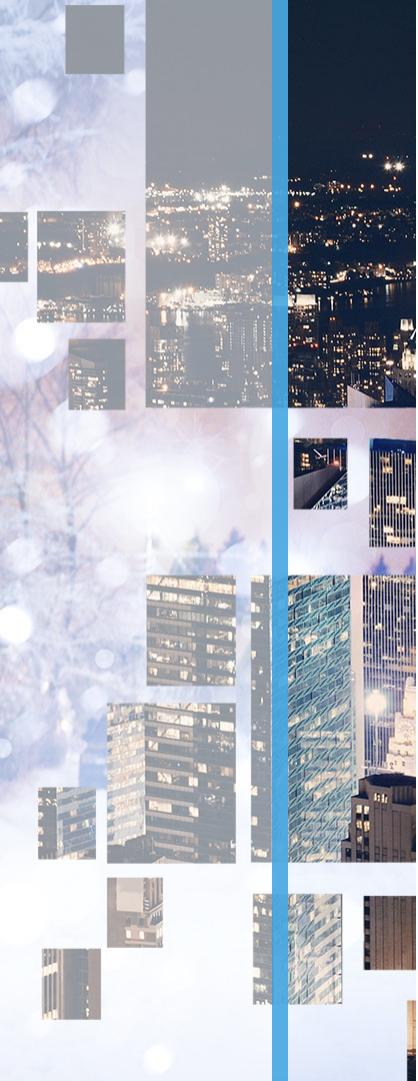


# Weather Company Sub-Seasonal and Seasonal Forecasts



## Growing Importance in Energy Trading

- Traders want to take long-term positions
- Interested in extreme heat/cold events
- Forecast Days 16-20 Very Important
- Temperature and Precipitation (Anomaly)
- Renewables (Wind/Solar) Forecasts
- Agriculture, Retail, Insurance Applications

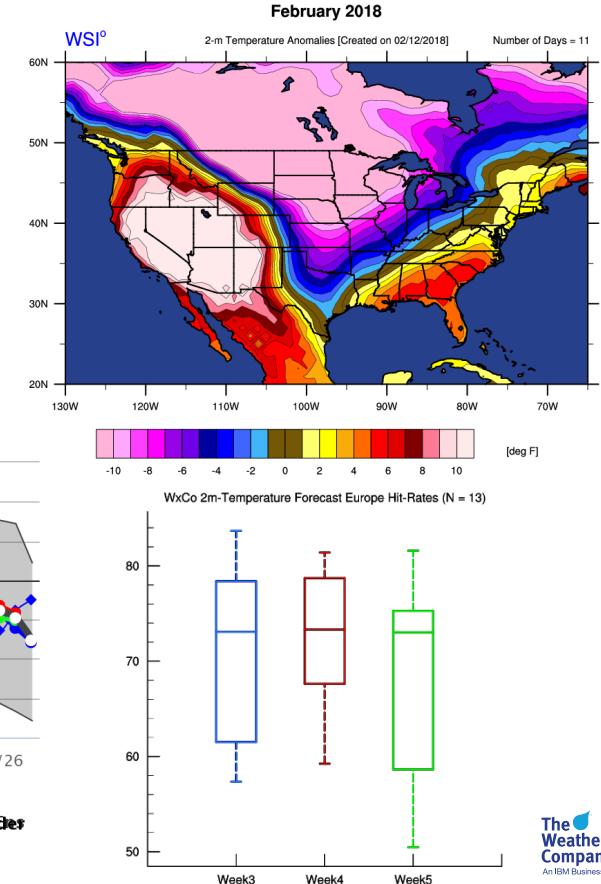
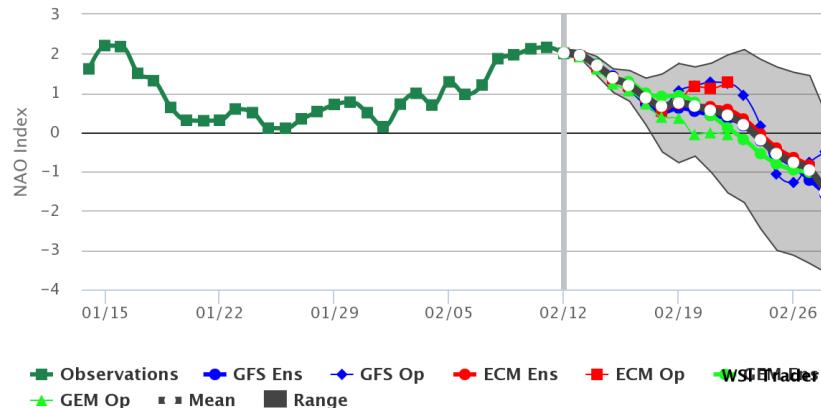


# NOAA Data in Sub-Seasonal/ Seasonal Platform

- **0-hr GFS Operational Model**
  - Utilized for a real-time “Observations” dataset
- **CFSv2 Weekly Model**
  - Utilized in Week 3-5 Forecasts
  - Product Suite Available
- **NMME Climate Models**
  - Utilized in Month 1-7 Forecasts
  - Product Suite Available

# GFS 0-hr Forecast – “Observations”

- Stored 0,6,12,18Z 0-hr GFS Op .grib forecasts since 2013
- Used for “Observations” throughout wsitrader.com
- Used in Verification



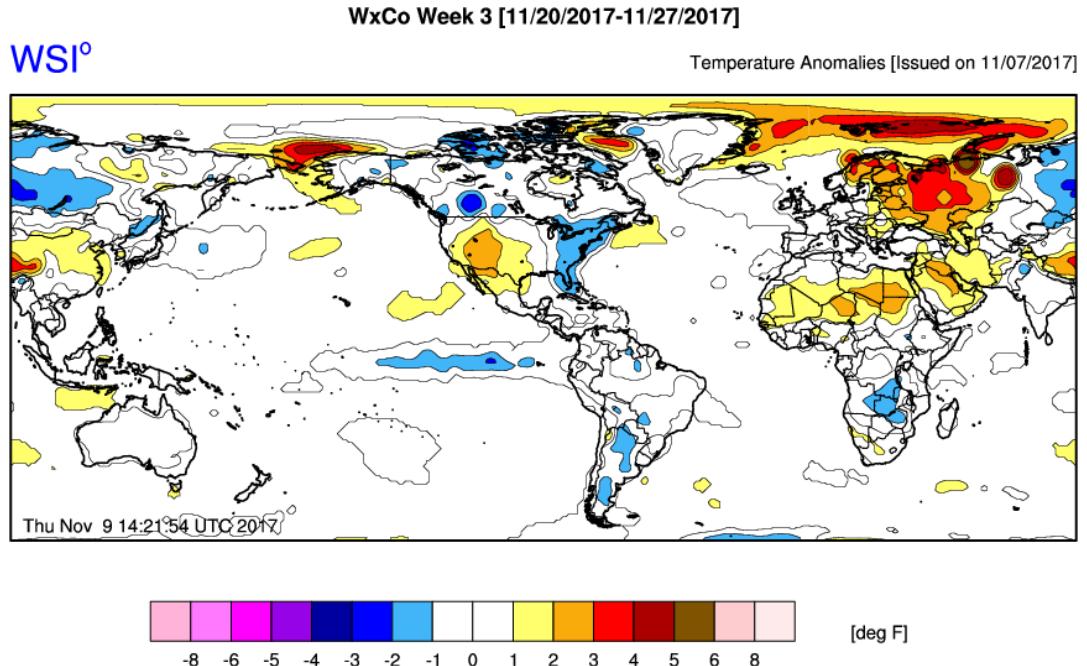
# Sub-Seasonal

- **Models**

1. ECMWF
2. CFSv2

- **CFSv2 Product Offerings**

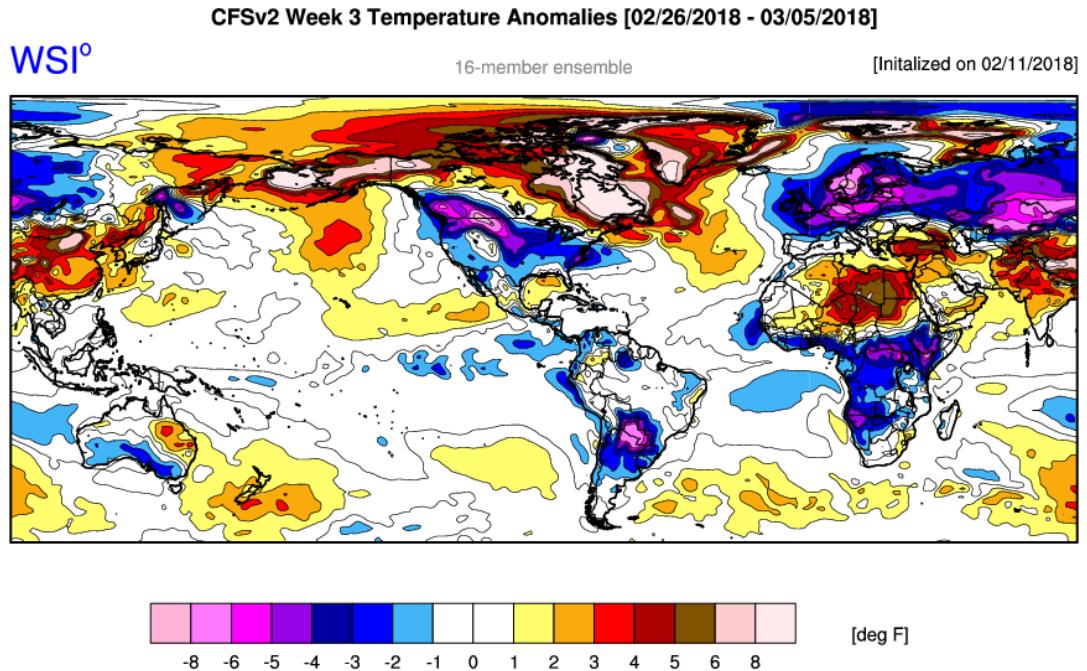
1. 2m Temperature Anomalies
2. Precipitation Rate Anomalies
3. 50mb Temperature Anomalies
4. 50mb Geopotential Heights
5. 500mb Geopotential Height Anomalies
6. 200mb Velocity Potential Anomalies
7. MJO Filtered VP200 Anomalies
8. Low-Frequency Filtered VP200 Anomalies
9. Atmospheric ENSO Index



- Week 3, 4, and 5 Forecasts of Temperature + Precipitation Anomalies
  - CFSv2 + ECMWF Blend (Equal Weighting)
  - Human Forecasts are generated for U.S. and Europe (Temperature Only)
  - Data accessible to clients via API or .PDF (Report)

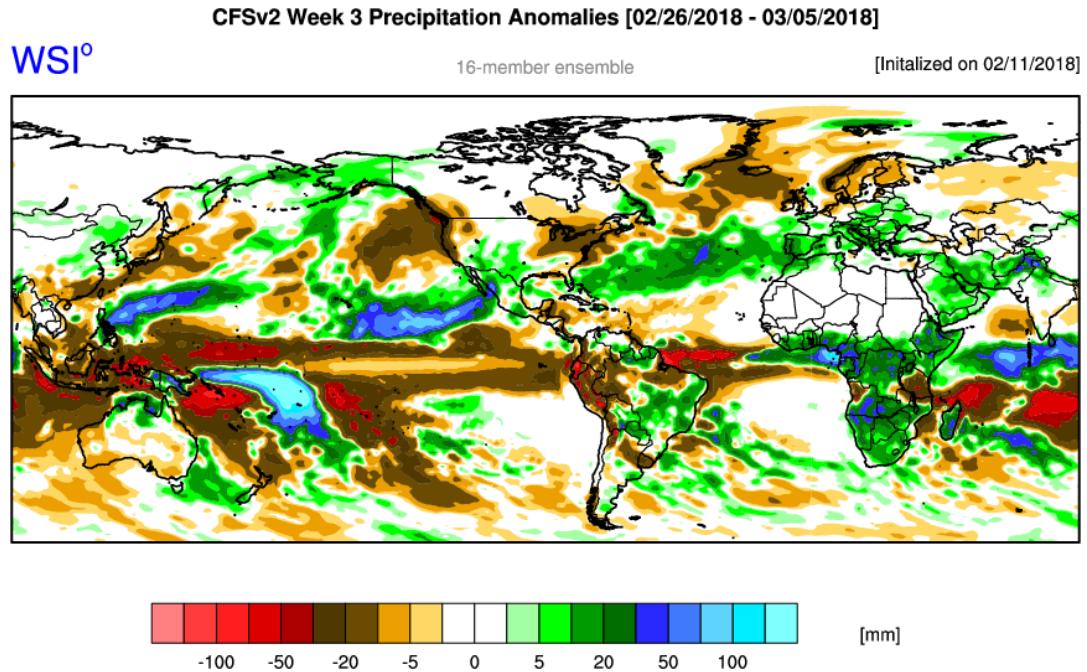
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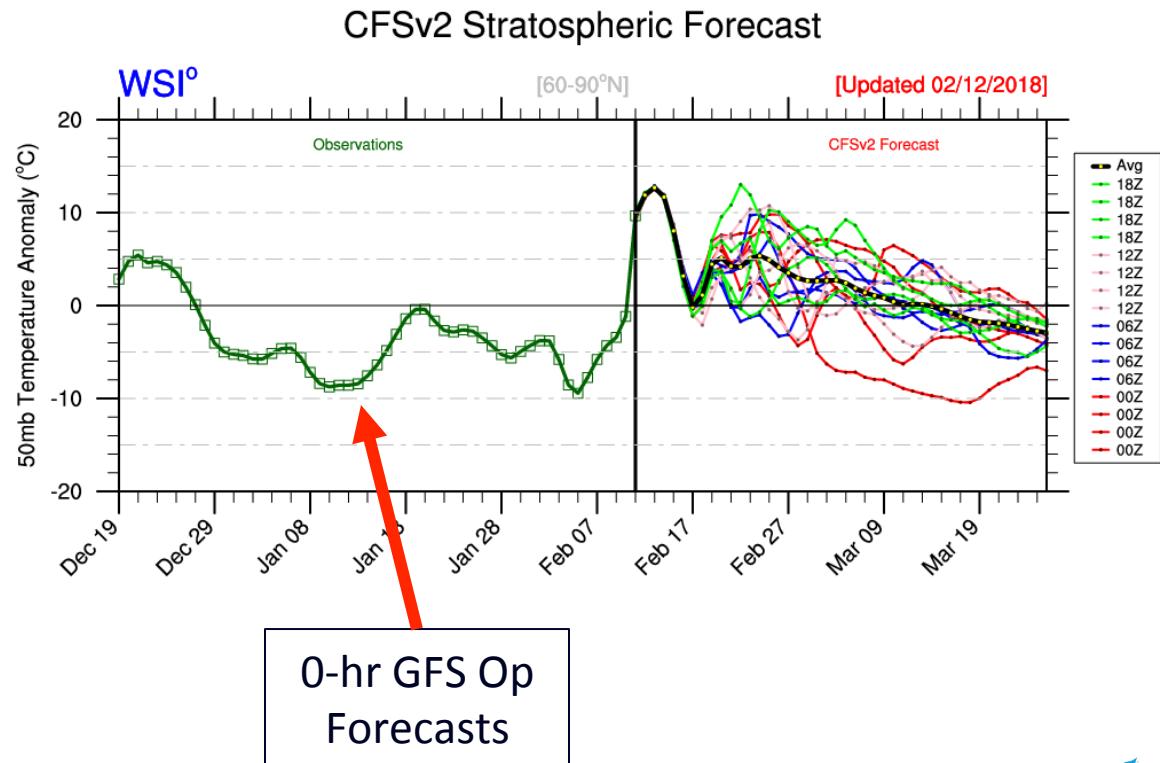
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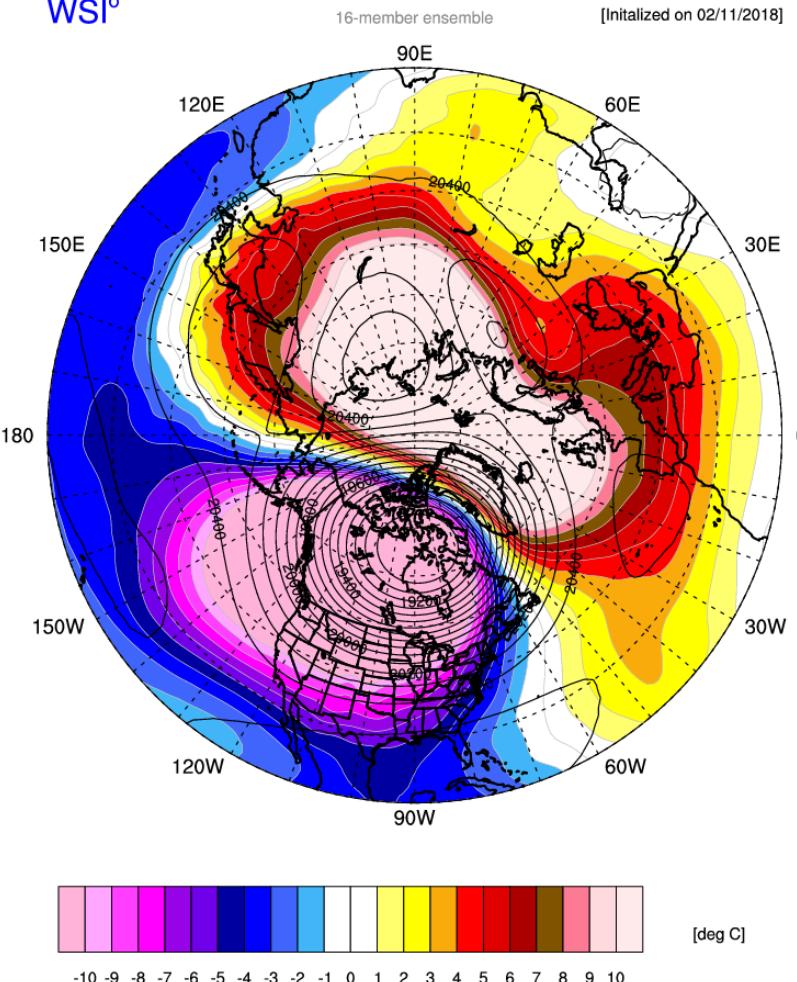


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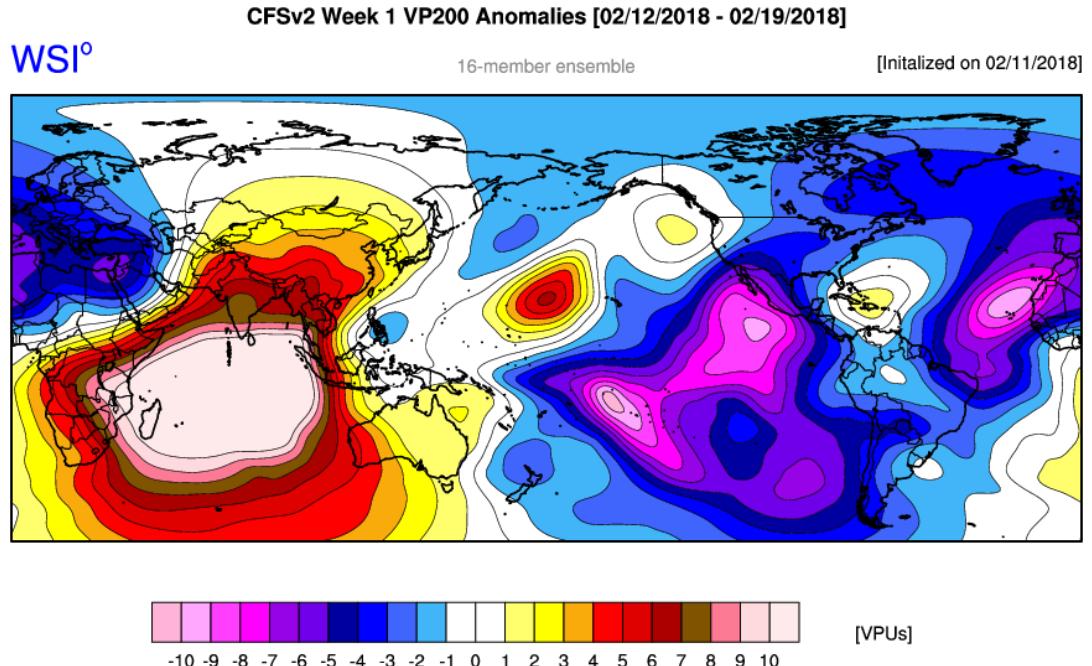
CFSv2 Week 1 50mb GeoHeights + Temperature Anomalies [02/12/2018 - 02/19/2018]

WSI°



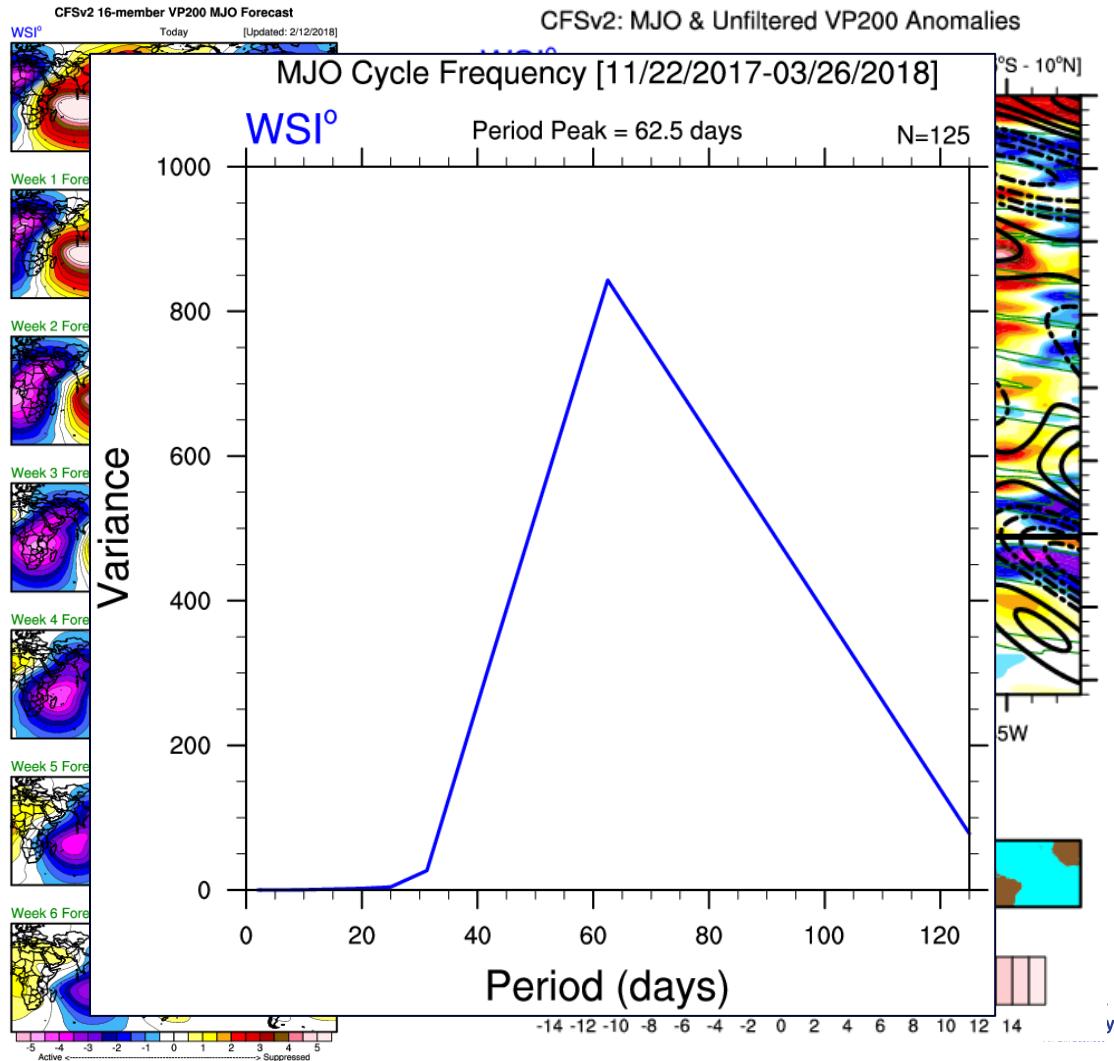
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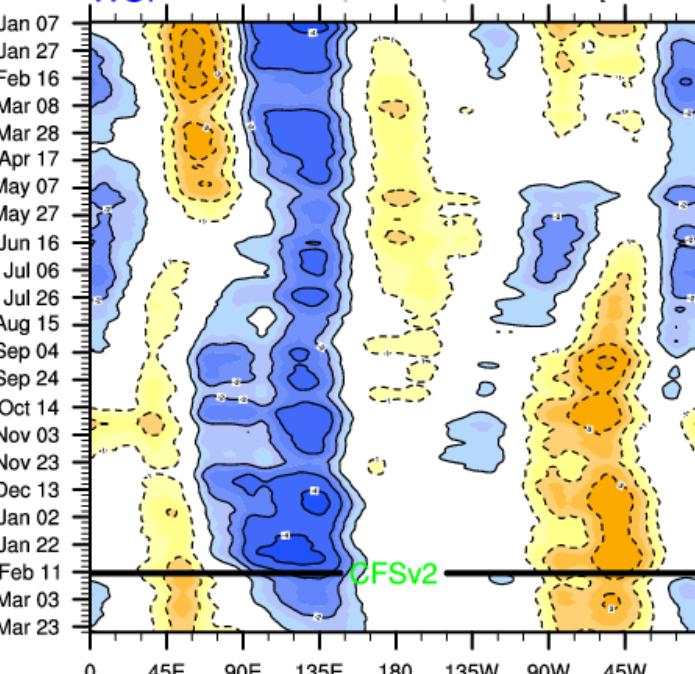


# Sub-Seasonal

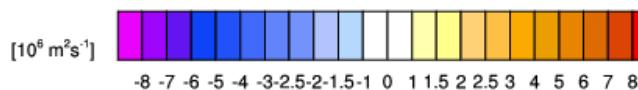
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CFSv2: Low Frequency Filtered VP200 Anomalies

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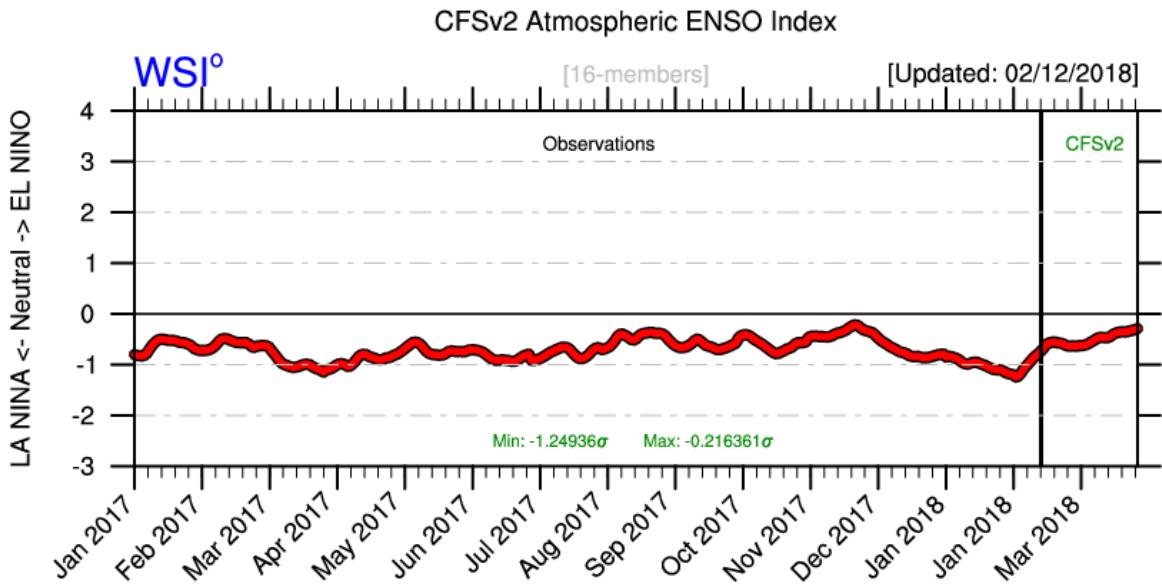


Updated: 02/12/2018



# Sub-Seasonal

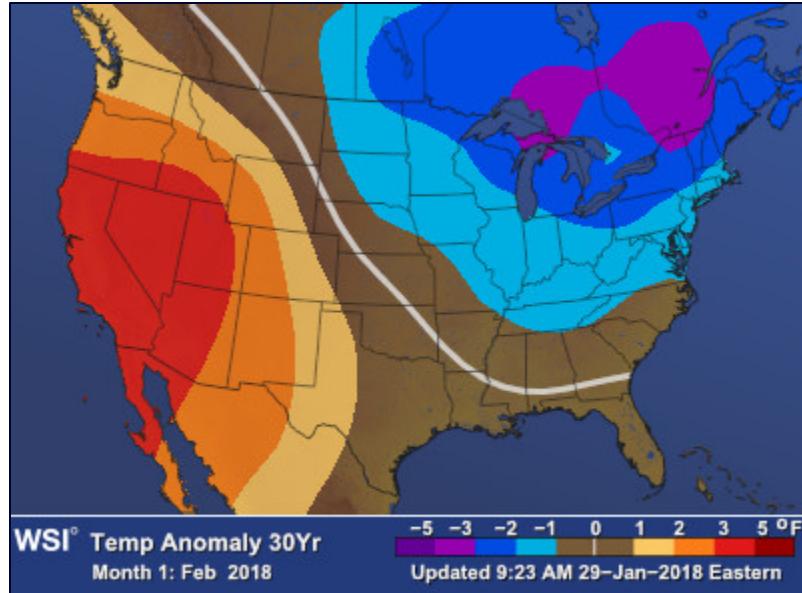
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2018 AMS Poster: **New ENSO Identification: Applications for Seasonal Prediction**  
(<https://ams.confex.com/ams/98Annual/webprogram/Paper321547.html>)

# Seasonal

- Models
  - 1. ECMWF
  - 2. NMME
  - 3. CanSIPS
- NMME Product Offerings
  - 1. 2m Temperature Anomalies
  - 2. Precipitation Rate Anomalies
  - 3. 50mb Temperature Anomalies
  - 4. 50mb Geopotential Heights
  - 5. 500mb Geopotential Height Anomalies
  - 6. 200mb Velocity Potential Anomalies
  - 7. MJO Filtered VP200 Anomalies
  - 8. Low-Frequency Filtered VP200 Anomalies
  - 9. Atmospheric ENSO Index

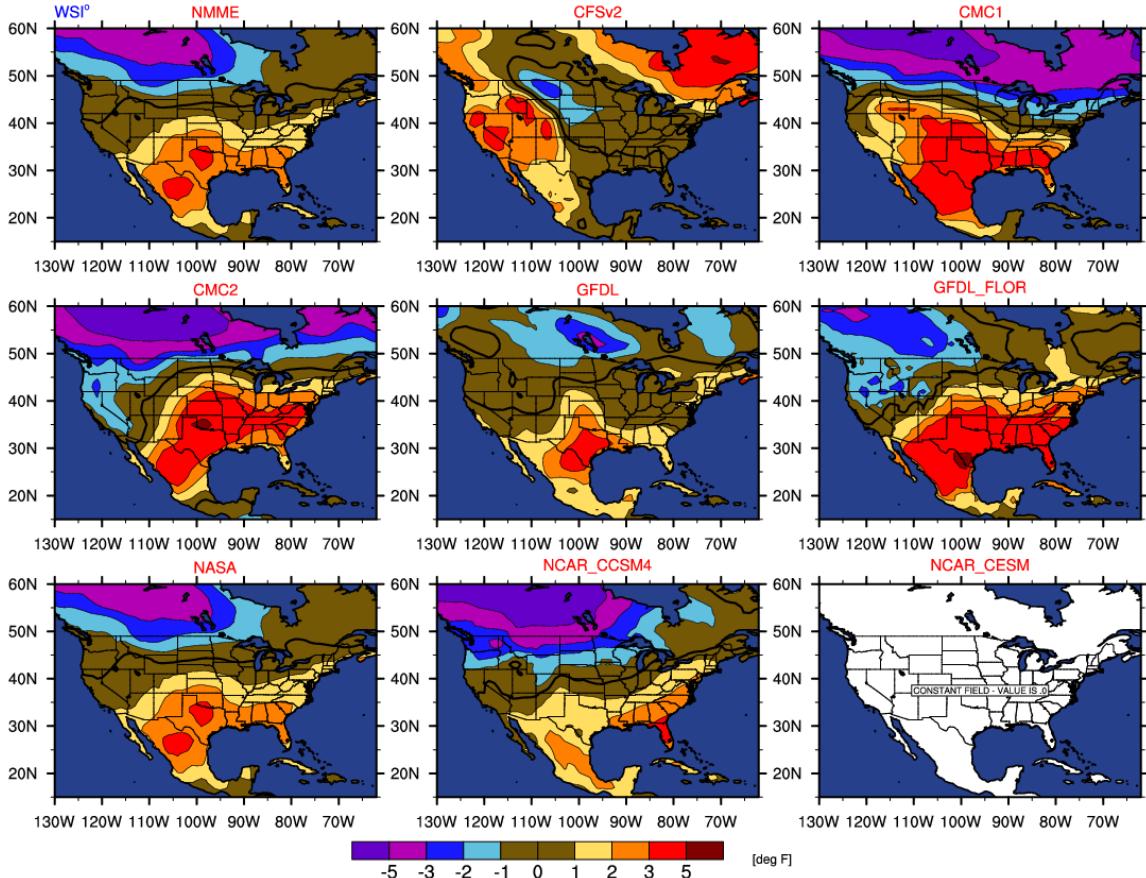


- Only Using Ensemble Means at the moment
  - Building a Probabilistic Platform for Seasonal
    - Version 1 = ECMWF
    - Version 2 = ECMWF + CFSv2
    - Version 3 = ECMWF + CFSv2 + NMME?

# Seasonal

- **Models**
  1. ECMWF
  2. NMME
  3. CanSIPS
- **NMME Product Offerings**
  1. 2m Temperature Anomalies
  2. 2m Temperature Differences
  3. Precipitation Anomalies
  4. Precipitation Differences
  5. SST Anomalies
  6. SST Differences
  7. ENSO Forecast
  8. Pacific Decadal Oscillation
  9. Atlantic Multidecadal Oscillation

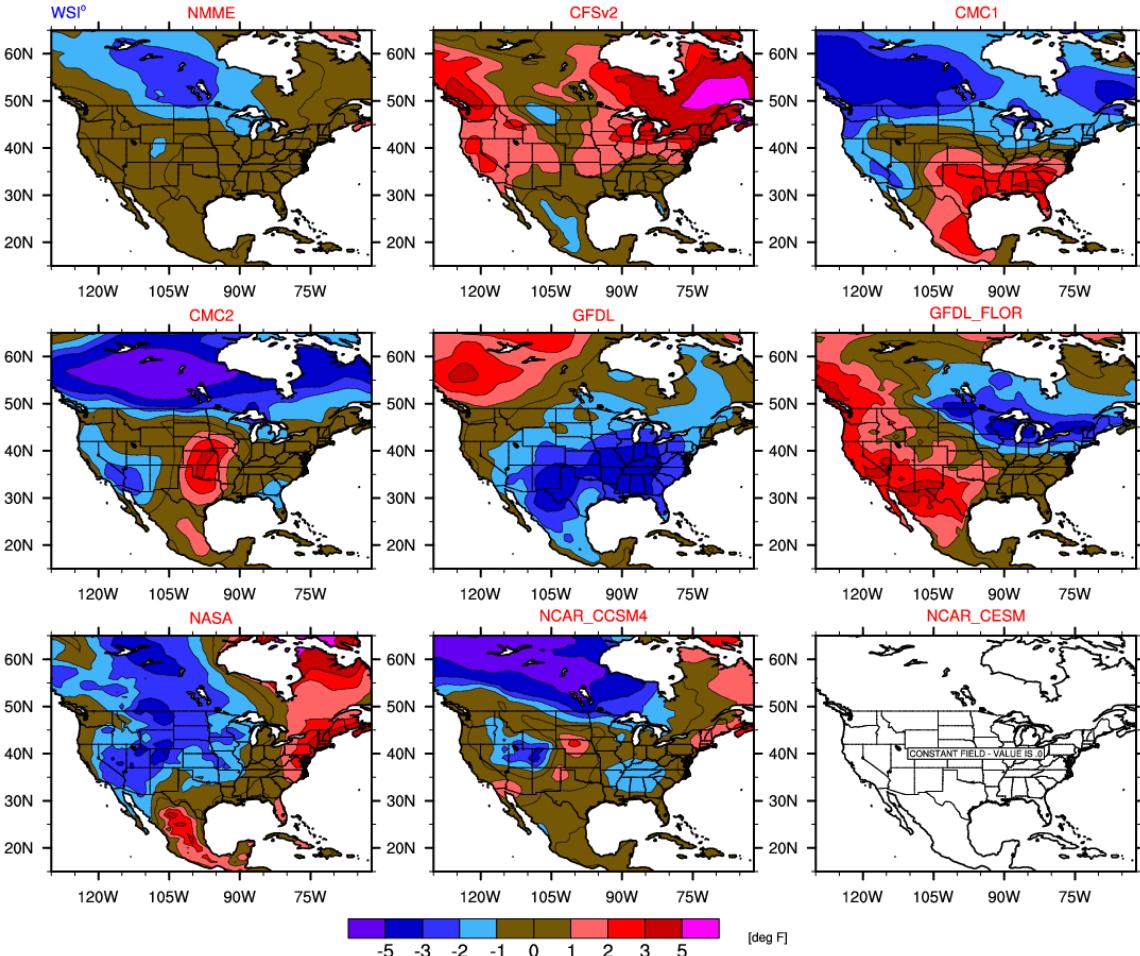
March 2018 2m Temperature Anomaly Forecast [Initialized on 02/08/2018]



# Seasonal

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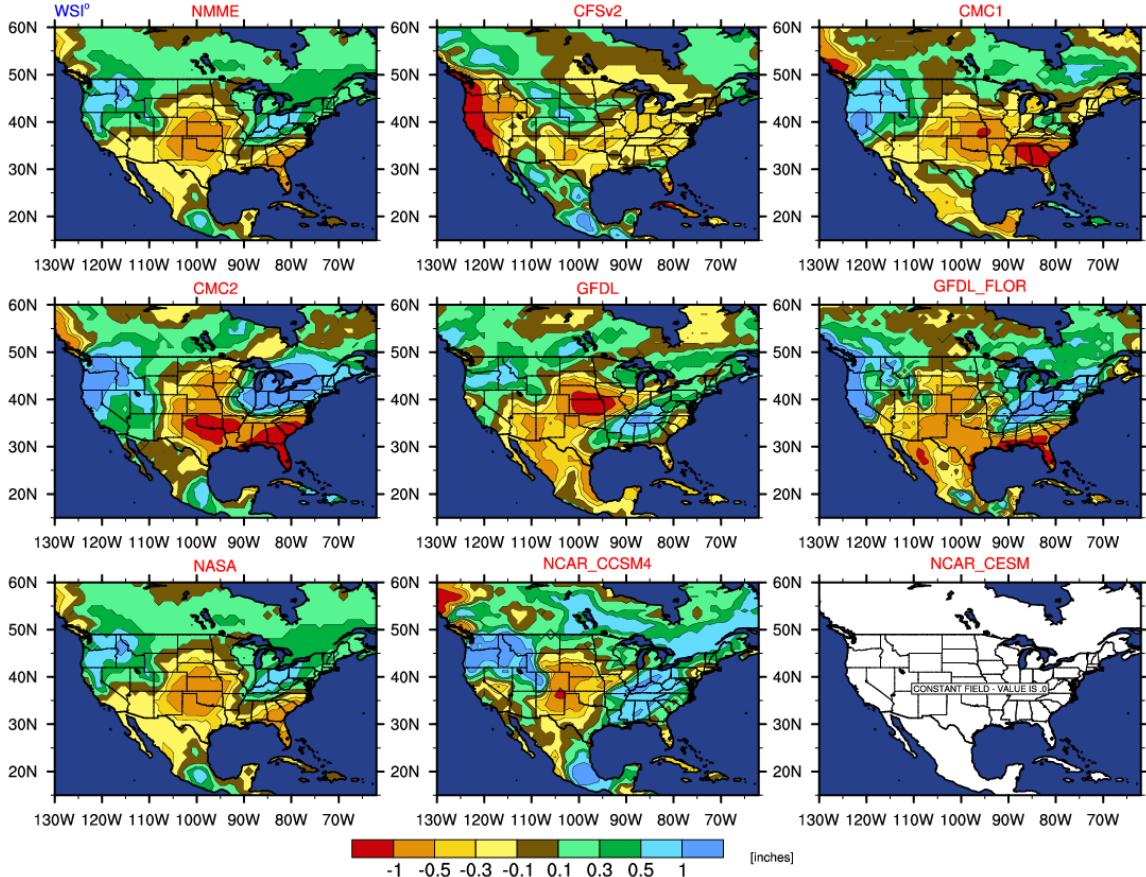
March 2018 1-month 2m Temp Diff [Initialized on 02/08/2018]



# Seasonal

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- **NMME Product Offerings**
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  4. Precipitation Differences
  5. SST Anomalies
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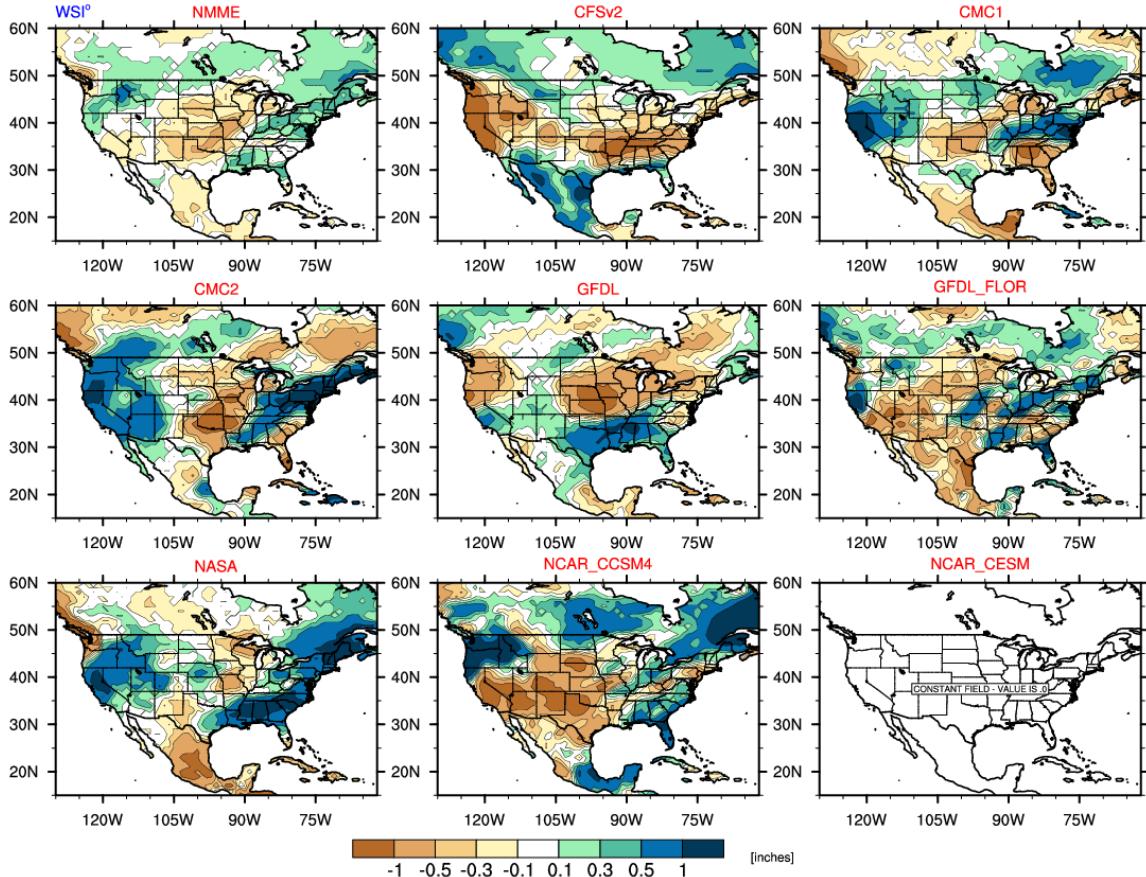
March 2018 Precipitation Anomaly Forecast [Initialized on 02/08/2018]



# Seasonal

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March 2018 Precipitation Differences [Initialized on 02/08/2018]



# Seasonal

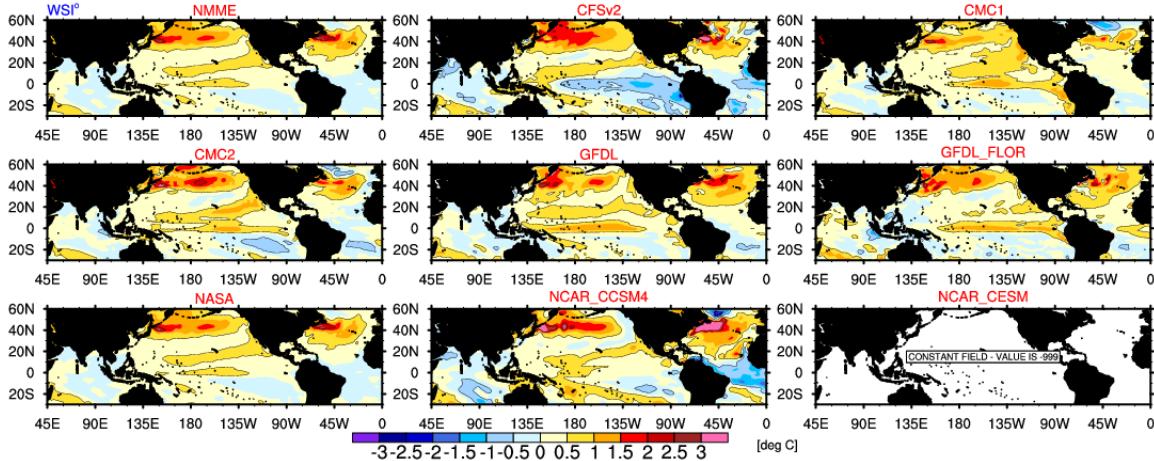
- **Models**

1. ECMWF
2. NMME
3. CanSIPS

- **NMME Product Offerings**

1. 2m Temperature Anomalies
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4. Precipitation Differences
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9. Atlantic Multidecadal Oscillation

August 2018 SST Anomaly Forecast [Initialized on 02/08/2018]



# Seasonal

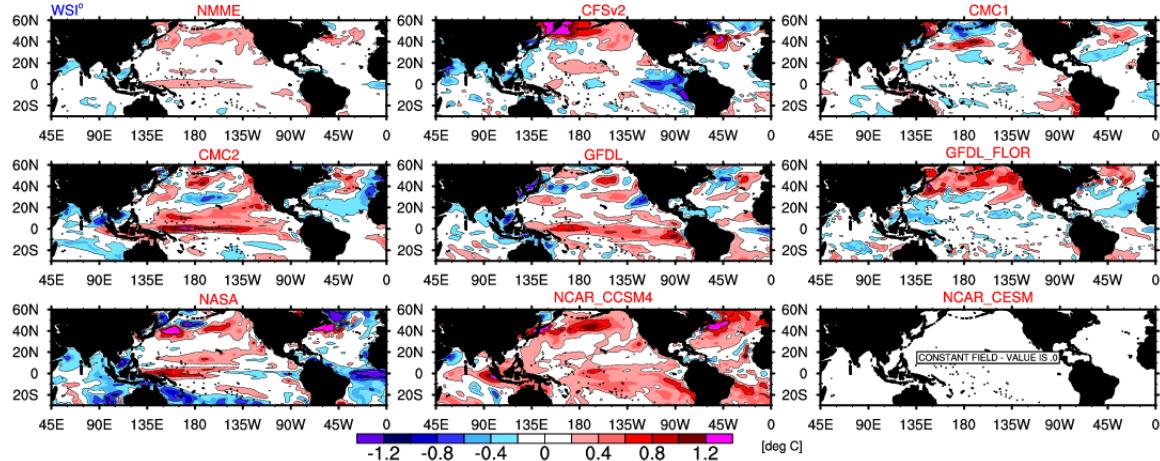
- **Models**

1. ECMWF
2. NMME
3. CanSIPS

- **NMME Product Offerings**

1. 2m Temperature Anomalies
2. 2m Temperature Differences
3. Precipitation Anomalies
4. Precipitation Differences
5. SST Anomalies
6. **SST Differences**
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8. Pacific Decadal Oscillation
9. Atlantic Multidecadal Oscillation

August 2018 1-month SST Difference [Initialized on 02/08/2018]



# Seasonal

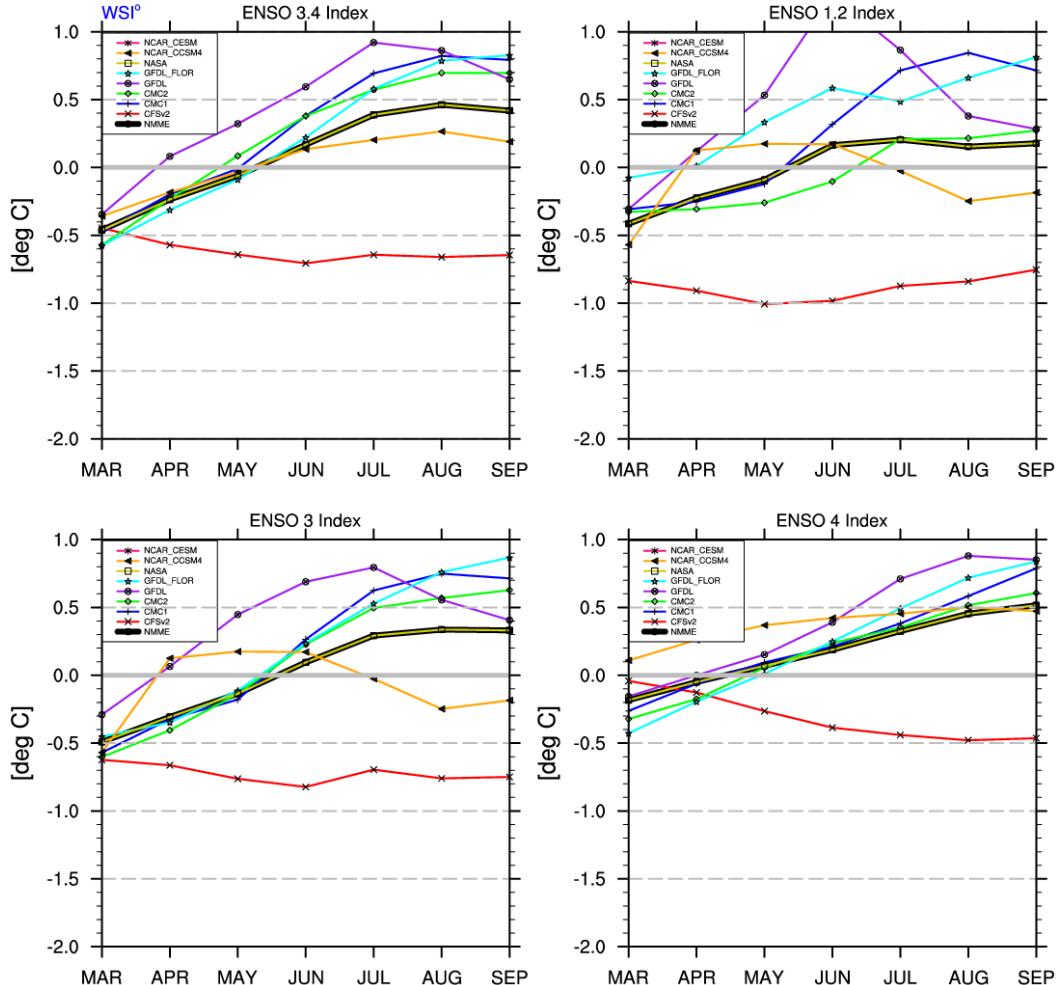
- **Models**

1. ECMWF
2. NMME
3. CanSIPS

- **NMME Product Offerings**

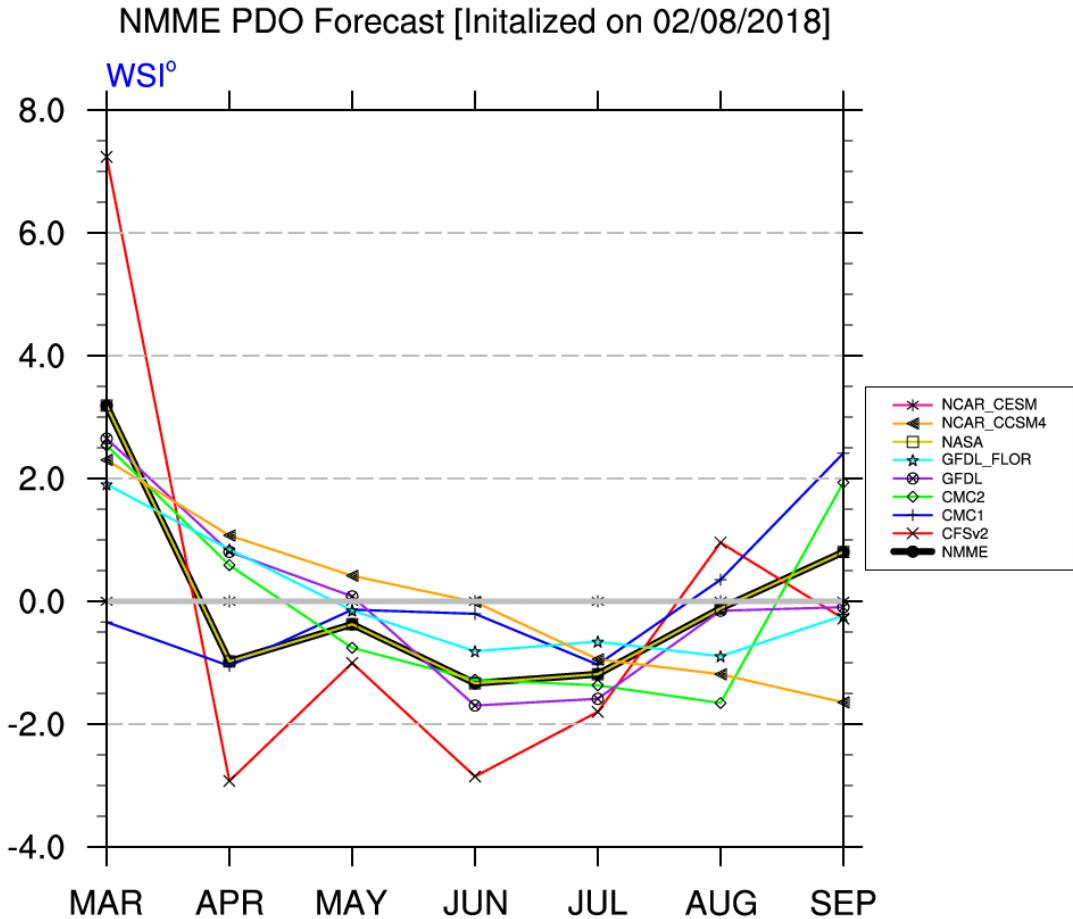
1. 2m Temperature Anomalies
2. 2m Temperature Differences
3. Precipitation Anomalies
4. Precipitation Differences
5. SST Anomalies
6. SST Differences
7. **ENSO Forecast**
8. Pacific Decadal Oscillation
9. Atlantic Multidecadal Oscillation

NMME ENSO Forecast [Initialized on 02/08/2018]



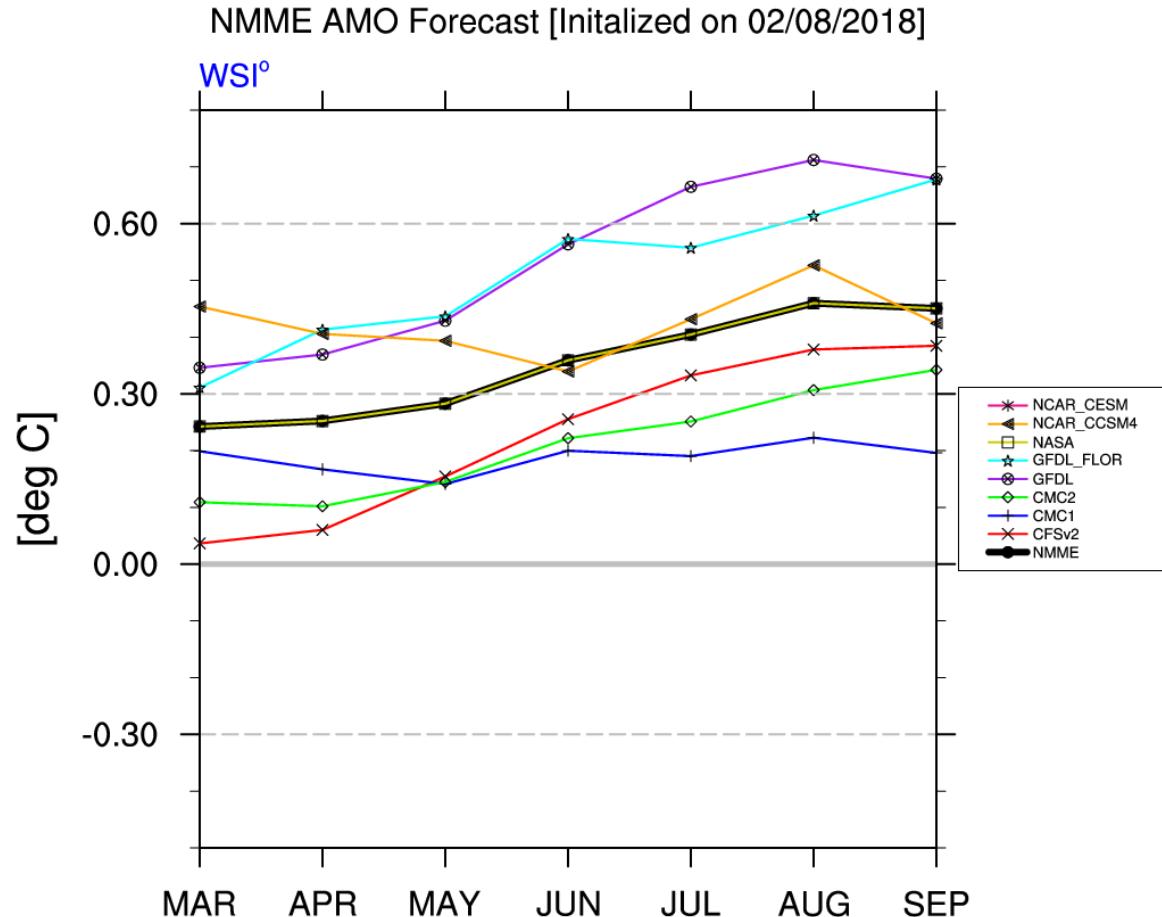
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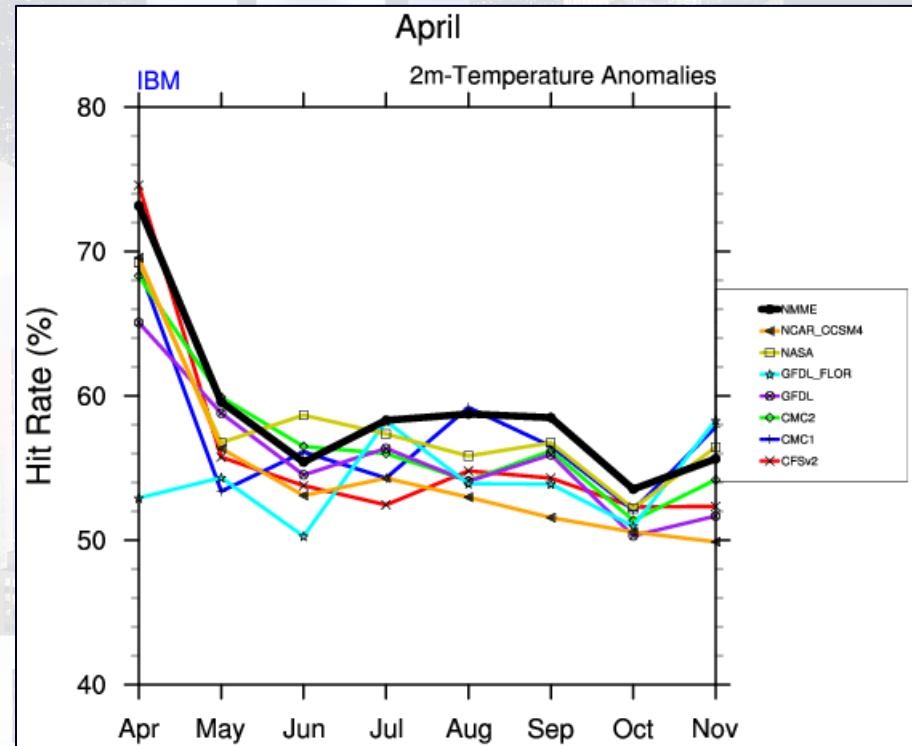
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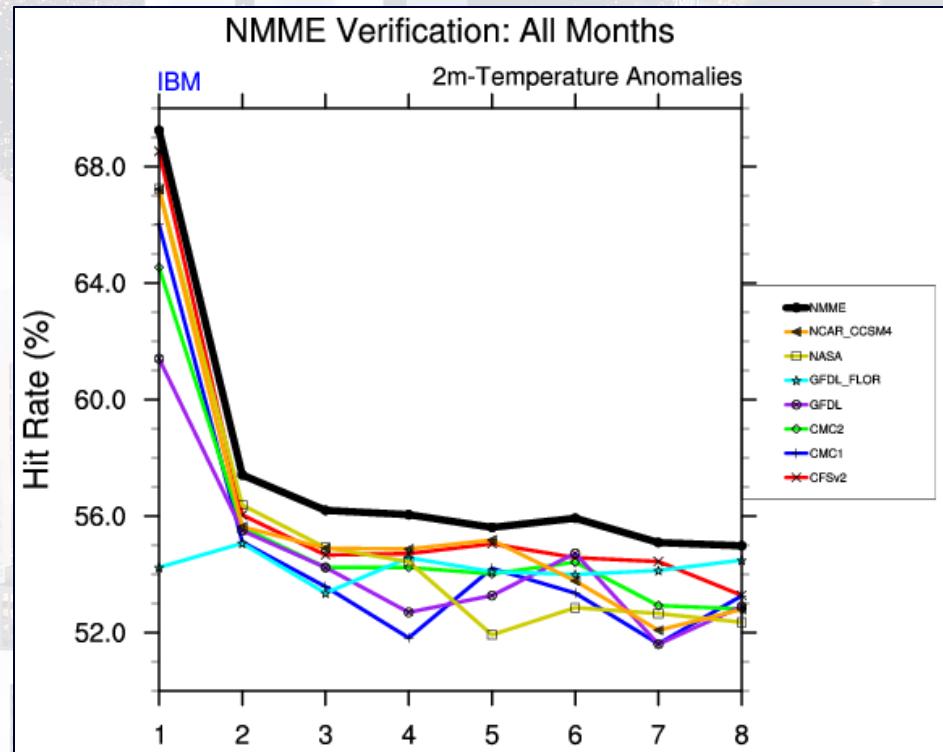
# NMME Research

- Explored Skill in Predicting Temperatures and Precipitation (U.S. & Europe) for all lead times
- Break down into Monthly Periods
  - Odd Spike in November Skill?



# NMME Research

- Explored Skill in Predicting Temperatures and Precipitation (U.S. & Europe) for all lead times



# Conclusions

- Large use of NOAA data inside the Weather Company – Energy Focused Business (not limited to)
- GFS 0-hr forecasts are used to create a quick, on the fly updating observational dataset
- CFSv2 is used as a component model for Sub-Seasonal Forecasts
- NMME is used as a component model of Seasonal Forecasts





# Thank You

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